

◆ G-4 NEWS ◆

Volume 2 Issue 2

The Newsletter for Oxygen Compatibility Practitioners

Fall 1995

John Cronk Takes G-4 Helm

A new slate of leaders takes control of G-4 beginning January 1. Our new chairman is John O. Cronk of Liquid Air Engineering Corp. John provided stellar task force leadership for G-4 in the 1980s, playing a major role in the Committee's program to test metals under industry sponsorship and then write a standard on them—ASTM G 94 was the result. Curiously, G-4 recently decided to once

again undertake similar experimental work and so the return of John's skill is fortuitous.

The new Vice-Chair will be Joel Stoltzfus of NASA's White Sands Test Facility moving up from the Secretary position these past three years. The Secretary position will be filled by Dwight Janoff of Lockheed Martin. Both Cronk and Janoff are new to main Committee offices.

Sadly, this brings Coleman Bryan's superb leadership for the past six years to a close. Coleman took the helm when some thought the Committee's work was basically complete, and he guided it to new heights. Our most successful symposia, the maturing of our oxygen compatibility course into the second most successful in ASTM, and the birth of **G-4 News** were just a few of his team's successes. But there is good news in that both Coleman and Vice Chair Ken McIlroy are continuing with their other efforts: Coleman as chair of the Test Methods subcommittee and Ken as Chair of the Practices Subcommittee. **G4N**

Progress at Norfolk:Stunning New Developments!

The arrival of the Internet, a program to test stainless steel under industry sponsorship, a new draft standard on studying incidents, and a rejuvenated seminar series made for a hectic three-day abbreviated meeting. And that is before you add the regular fare including new officer elections and ballots of six standards.

The **G-4 Main** Committee announced new officers (see above), that G-4 now has a trial home page on the Internet thanks to Dwight Janoff (see article p.2), and that the Spring '96 meeting (Orlando) will be coordinated with SAE Committee A-10 meetings (cross attendance at each other's meetings will be allowed).

The **G4.01 Test Methods** Subcommittee reapproved G 86 on Pressurized Mechanical Impact and reconciled a ballot on oil film analysis by high-temperature oxidation analysis.

Round robin tests indicate a precision and bias statement will be possible in G 122 (on Cleaning Effectiveness), but progress has been slow.

The G 72 round robin testing is still advancing but remains incomplete.

Changes that G-4 would like to see in Standard D 2512 on LOX Mechanical Impact tests were agreed to and will be forwarded to F-7 for a ballot to approve the changes and transfer D 2512 to G-4. Meanwhile, G-4 will conduct an unofficial ballot of the changes and to accept transfer of D 2512.

The **G4.02 Practices** subcommittee scheduled an experimental study in FY 96 of stainless steel in various geometries and sizes as the first of its industry-sponsored efforts to fill gaps in the compatibility knowledge base. A plan to conduct tests at

NASA WSTF was adopted with two phases and tentatively about \$50k of effort. This effort results from intense interest in industry in identifying new regimes in which stainless steel can be used safely (see article p. 2).

The Subcommittee nearly reconciled two Main Committee ballots which dealt with differing portions of G 93. Several items will be reballoted. Bill Royals leads the effort on this difficult standard.

The Standard G 120 on Soxhlet Extraction was balloted for conversion from a test method into a practice and passed.

An ultrasonic extraction standard prepared by Coleman Bryan was also successful in Main Committee ballot. There were no negatives and so the standard will proceed to Society ballot and next Spring.

The Committee considered a proposal to undertake a standard on techniques and analysis that have been useful in studying causes of oxygen incidents. The project was accepted and a draft standard will be balloted this winter (see article p.2).

The **G4.05 Education** subcommittee hosted three papers as part of its Seminar Series (See article, p. 3). The papers will be published with the papers of the next symposium in 1997. Indeed, the Committee agreed to aggressively promote this series in an effort to increase the volume and

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Standard on Incident Study Begun

G-4.02 on Practices agreed to begin a new standard on the study of incidents in oxygen systems. The standard is not intended for forensic use and will not be represented as a rigorous method to identify causes of incidents. Rather, the standard will be a collection of individual study methods that have been useful in the past with suggestions for effective use and cautions about misuse.

In this way, the standard will be a "living document" with new items being inserted (or perhaps old items being dropped) over time. The intent is to foster collegiality on the prevention of incidents and provide a means to share certain as-

pects of incidents more openly than has been common in the past.

The standard is expected to provide an underlying basis for the Advanced Oxygen Compatibility course in preparation. That course was planned to be a series of incident case studies. Hopefully, when this standard is complete, the incidents can be examined in the context of alternative tools or tactics that might have been applied from the standard.

A draft standard was briefly discussed and comments will be collected and incorporated so that a ballot can be conducted for the Spring meeting at Orlando.

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(Progress continued from page 1)

quality of the G-4 collegium. Commitments for papers at each G-4 meeting will be sought. This could reduce the length of the next symposium but may lead to a more spirited dialog within the community.

This past summer, the subcommittee issued its long-promised computer utilities disk. A new algorithm for calculating volumes of distance/volume pieces used with flex hoses was reviewed as part of the G4Math utility and will be letter-balloted for the spring meeting.

The Technical and Professional Training (TPT) course is in the throes of heavy demand at present. Joel Stoltzfus estimated that between the public and private offerings this year, there has been a session given every month, making this the second most active course in the ASTM curriculum. The class held in conjunction with this meeting contained 30 students.

The Advanced TPT Course Task Force is progressing with the review of incidents that were submitted for use in the course. Progress is slow. It was agreed to coordinate this course with the completion of the incidents-study standard from G4.02 and to cover that standard as part of the course, as well as using it in comparing and contrasting incident responses in the case studies to those in the standard. Joel Stoltzfus suggested that available detailed NASA hazards reviews may also be useful elements to include in the advanced course as additional material. He will provide some for review.

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Joint Study Program Launched

At the past Spring meeting, it was agreed to identify and fill gaps in the oxygen compatibility knowledge base. Task forces were assigned to undertake this effort, and the metals task force is focusing first on the wider safe use of stainless steel alloys in oxygen. Such use would provide substantial savings in industry and shorten lead times for obtaining components. Several companies have expressed a willingness to contribute to this experimental effort.

In FY 96, the task force will attempt to define, fund and execute a series of tests representing about \$20k-\$60k of effort at the NASA White Sands Test Facility using ASTM G 124 (Promoted Combustion). This may be divided into two tasks.

The initial goals will be to examine stainless steel in thicknesses greater than 0.125 in. (3.2 mm). An upper limit of 0.5 in. (13 mm) is under consideration for this first stage. A second alloy may be included in some tests, and tubes both with and without flow in the bore, as well as rods with flow along the surface may be of interest. Very importantly, a few tests will focus on whether

large bore tubes burn more nearly like rods of similar outside diameter or as rods of diameter similar to the wall thickness or neither.

When the proposed program is complete, solicitations of funding will be issued with a target January 1996.

Other efforts on gaps in the knowledge base will follow, but initial efforts will not stress them.

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G-4 Is Internet Bound?

Thanks to a monumental effort by Dwight Janoff, ASTM Committee G-4 is on the World Wide Web. Dwight has programmed and is piloting a home page. It has been on-line since September 18, and there have been three to eight visitors daily. Dwight installed the Spring 95 *G-4 News*, the list of literature references from the G-4 Computer Utilities disk, and the G-4 Member Info Packet.

Although the Committee has had information available on a CBBS provided by Paul Klein at the Naval Air Engineering Center, it received little use and is no longer operational. Those who have seen the new home page were suitably impressed. This will provide another way to distribute the newsletter to those who prefer to receive it on the Web and will allow more convenient maintenance of the utilities. There is no file transfer facility at present (but one is expected soon), nor is there a registration mechanism to allow E-Mail notices. The Committee is pursuing a permanent residence for the file at either ASTM or another computer facility.

If anyone wishes to try it out, the address is L12ID.JSC.NASA.GOV. Note that ASTM also has a general home page at: WWW.ASTM.ORG

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The "CGA." What's that?

The Compressed Gas Association, Inc. (CGA) is mentioned often in G-4's meetings and publications. Just what is the CGA?

Unlike G-4, the CGA's members are not individuals but rather are more than 200 companies organized to promote safety in the industrial gas, cryogenic liquid, and related products industry—one company, one vote. Formed in 1913, the participating representatives of the member companies prepare and vote on technical specifications, safety standards, training and educational materials, and they work with government agencies in formulating regulatory materials.

Like G-4, Standards developed by CGA are recommendations and compliance with them is voluntary.

Although there is some overlap in the subjects and products of CGA and G-4, CGA is not open to the general public, but its products are available to the general public. CGA has a newsletter, *Compressions*, but it is available only to members.

CGA is active in the U.S. and Canada directly, and worldwide through involvement with International Standards Organization (ISO) and the European Industrial Gases Association (EIGA). CGA believes its efforts have been a major factor in allowing the U.S. compressed gas industry to be "largely self-regulating."

It is just random luck that CGA's category for oxygen-related publications starts with the designation: G-4, which is the same as the ASTM designation for its oxygen committee. Among the CGA efforts of interest to practitioners of oxygen compatibility are their pamphlets on oxygen safety: G-4 (a specification), G-4.1 (on cleaning), G-4.4 (on pipelines), G-4.6 (on compressors), G-4.8 (on aluminum structured packing), and also P-14 (on oxygen-enriched and oxygen-deficient atmospheres).

CGA may be reached at:
Compressed Gas Association, Inc.
1725 Jefferson Davis Highway
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Arlington, VA 22202-4102
Phone (703) 412-0900
FAX: (703) 412-0128
FAX-On-Demand: 1-800-UASKCGA
(Computer prompted free literature)
E-Mail:

Compressed_Gas_Association@MSN.COM

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Seminars Revitalized

Committee G-4 has provided a seminar forum for more than four years, but few papers have been offered. Recently, there has also been a decrease in the rate of paper offerings at G-4 symposia. In order to maintain the vitality of these colloquia, the Committee agreed to revitalize the seminar forum. This should help improve the volume and quality of papers and foster a more dynamic formal dialog.

As a result, three or more papers will be solicited for presentation at *each* Committee meeting. These papers will be included in the Special Technical Publications (STPs) that publish after each symposium. Since two to three years will pass until some of these papers are published, authors will be allowed to provide limited copies after peer review to others upon their moral obligation to purchase the STP when it becomes available.

At the Fall '95 meeting, three papers were offered. The addresses of the authors are all: Air Products and Chemicals, Inc., 7201 Hamilton Blvd., Allentown PA 18195-1501.

"Design Strategies for Polymer-Lined Flex-Hose Distance/Volume Pieces," by Anthony J. Santay, Irving D. Becker Jr., and Barry L. Werley.

ABSTRACT: Several strategies are presented for the design of "distance/volume pieces (DVPs)" used to cope with adiabatic compression hazards in the use of polymer-lined flexible hoses. A well-designed metal DVP located at the dead-end of a system will contain the hot gases produced during compression of the ini-

tial hose contents and spare the more easily ignited polymer from ignition. One design strategy contains the entire final hot slug of gas within the DVP, the other contains all of the gas that nominally exceeds a given temperature. System modifications that might enhance the effectiveness of DVPs are also described.

"Flammability Limits of Stainless Steel Alloys 304, 308, and 316," by Barry L. Werley and James G. Hansel.

ABSTRACT: More than one-hundred specimen combustion tests suggest stainless steel thresholds of sustained propagation of combustion depend to a great degree on diameter, tubing wall thickness, positive-burn criteria, presence of flow through tubing, and alloy composition, and to a smaller extent on surface finish and oxygen purity.

"A Brief Study of Steel Combustion Using Quick-Frozen Test Specimens," by Barry L. Werley.

ABSTRACT: Combustion tests of iron and steel have led to many theories. A new model of steel combustion at low pressure is proposed. This model suggests a burning droplet comprises an oxide bubble, spherical molten steel core, and a gas-filled annulus. The significance of "excess oxygen" in the slag melt and of oxygen off-gassing from the slag are questioned.

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I want G-4 News!

Your name will be listed in our publicly available database of oxygen compatibility enthusiasts, please check *all* boxes that apply to you.

☐ New Request ☐ Correction

Name _____

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- ☐ G-4 Member
☐ G-4 Symposium
☐ G-4 TPT Course Student
☐ Consultant
☐ Commercial Testing Source
☐ General Interest in Subject



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G-4 Events and Housekeeping

Regular meetings of the Committee G-4 have been scheduled as follows:

Mar 19-21, 1996Orlando, FL
Nov 13-14, 1996Seattle, WA
Mar 18-20, 1997.....St. Louis, MO
Nov 11-12, 1997.....San Diego, CA
Contact Steve Mawn (610) 832-9726 for details or membership data. ASTM Membership is \$65 per year.

The next G-4 Symposium is on:

Nov 13-14, 1997.....San Diego, CA
For a Call for Papers or Program, call Steve Mawn (610) 832-9726.

Public offerings of the course: *Controlling Fire Hazards in Oxygen Handling Systems* are on:

Mar 18-19 1996.....Orlando, FL
Nov 11-12, 1996Seattle, WA

Contact Scott Murphy (610) 832-9685 for information or brochure. Cost is \$675.00 (including text). Can be offered at your site for a negotiated price.

The two-volume course text: *Fire Hazards in Oxygen Systems* may be ordered from Scott Murphy (610) 832-9685. Price is \$195.

The G-4 Videotape *Oxygen Safety* PCN 12-700880-31 may be ordered from ASTM Customer Service at (610) 832-9585. Price \$75 (\$67 for members).

Recent G-4 Standards actions/revisions:

- G 127-95 "Cleaning Agents for Oxygen Systems...."
- G 128-95 "The Hazards and Risks of Oxygen and Their Control..."
- G 131-95 "Cleaning Materials and Component By Ultrasonic..."
- G 136-95 "Ultrasonic Extraction of Contaminants....."

All G-4 standards appear in part 14.02 of the Book of Standards or may be ordered individually from ASTM Customer Service (610) 832-9585. Typical standard prices range \$15-30.

Details:

This newsletter is a product of ASTM Committee G-4. The editorial staff is the G-4 Main- and Sub-Committee Officers and ASTM Staff:

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G4 Secretary	Joel Stoltzfus
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.02 Practices	Ken McIlroy
.03 Terminology	William Royals
.04 Planning	Richard Paciej
.05 Education	Barry Werley
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